

IN THE CLAIMS

I claim:

[Claim] 1.(currently amended) A robotic package unloading system for unloading [uniform as well as non-uniform and non-structured] bulk packages, comprising:

a container for holding [at least] more than one packages, selected from the group consisting of: uniformly shaped packages that have been stacked in a uniform pattern package, uniformly shaped packages that have been stacked in a random pattern, different shaped packages that have been stacked in a uniform pattern, and different shaped packages that have been stacked in a random pattern;

a robotic manipulator, wherein an end-of-arm tool is used to grip said package;

[a takeaway conveyor for moving said package,]

conveying [means which is actively positioned to engage the package at one end and to be connected to said takeaway conveying at second end] system for moving said packages,

wherein said conveying system has at least two sections connected with a flexible joint,

wherein the first section of said two sections is positioned where one of the packages is removed from

the container,

wherein the second section of said two sections interfaces with a fixed takeaway conveyor, and

wherein the second section of said two sections is allowed to articulate and maintain a physical interface between the first conveyor section and the fixed takeaway conveyor;

a[n image/] sensor to identify and locate said package in said container; and

a computer to control and process said robotic manipulator,[said articulating belt] said conveyor system, and said [image/] sensor.

[Claim] 2. (currently amended) The robotic package loading system as described in claim 1, wherein said conveying [means] system is [an articulating belt] a belt conveyor.

[Claim] 3. (currently amended) The robotic package unloading system as described in claim 1, wherein said conveying [means] system is a slide.

[Claim] 4. (currently amended) The robotic package unloading system as described in claim 1, further comprising:

a carriage for mounting said robotic manipulator and a section of said conveying system;

a carriage lift frame along which the carriage can move up and down; and

a lift mechanism to position said carriage at a [correct] height for unloading said package,
wherein the robot can reach the packages and the conveying system is positioned to engage the bottom of the package and help carry the container.

[Claim] 5. (original) The robotic package unloading system as described in claim 1, wherein said container is selected from the group consisting of a pallet, a bin and a case.

[Claim] 6. (canceled) [The robotic package unloading system as described in claim 1, wherein said package is selected from the group consisting of uniform and non-uniform and non-structured bulk.]

[Claim] 7. (original) The robotic package unloading system as described in claim 1, further comprising a safety enclosure to protect surrounding personnel.

[Claim] 8. (currently amended) The robotic package unloading system as described in claim 1, wherein said computer is used to process an algorithm to interpret the [image] sensor data and determine the location of packages for unloading.

[Claim] 9. (original) The robotic package unloading system as described in claim 8, wherein the computer provides the robot manipulator with position and path data so that the robot manipulator grips the package with a variety of preprogrammed strategies.

[Claim] 10. (currently amended) A method of unloading [uniform as well as non-uniform and non-structured bulk packages] from a container bulk packages selected from the group consisting of: uniformly shaped packages that have been stacked in a uniform pattern, uniformly shaped packages that have been stacked in a random pattern, different shaped packages that have been stacked in a uniform pattern, and different shaped packages that have been stacked in a random pattern, comprising the steps of:

holding [a] more than one package in a container;
positioning a carriage with robot manipulator relative to the position of the package;
gripping said package with a robotic manipulator having an end-of-arm tool;
moving said package [with a short takeaway conveyor belt onto said] onto a moving carriage;
connecting said moving carriage [with said takeaway belt] to a fixed conveyor with an articulating conveyor section;
identifying and locating said package in said container with an image sensor; and
controlling and processing said robotic manipulator, said [lift mechanism] moving carriage and said image sensor with a computer.

[Claim] 11.(canceled) [The method of unloading as described in claim 10, further comprising after the step of gripping the steps of:

mounting said robotic manipulator in a carriage frame so that the robotic manipulator can move up and down;

lifting said carriage to position said at a correct height for unloading said package with a lift mechanism.]

[Claim] 12.(currently amended) The method of unloading as described in claim 10, wherein said package is pulled outwards until the package makes contact with the takeaway conveying belt, and once the package makes contact with [the] a takeaway belt of the moving carriage, the robot manipulator releases the package and let the package be carried away to the articulating belt conveyor, which in turn carries the package to the fixed takeaway conveyor.

[Claim] 13. (canceled) [The method of unloading as described in claim 11, further comprising a step of lowering said carriage after complaint unloading all packages on a single layer until new packages ae sensed by said image sensor.]

[Claim] 14. (canceled) [The method of unloading as described in claim 13, further comprising a step of repeating said steps until all layers of the container are unloaded and the container is empty.]

[Claim] 15. (canceled).[The method of unloading as described in claim 13, further comprising a step of positioning a new container by an operator into positioning for automatic unloading system.]

Claim 16 (new) The robotic package unloading system as described in claim 1, wherein the container can hold more than one package on a layer which is selected from the group consisting of: uniformly shaped packages that have been stacked in a uniform pattern, uniformly shaped packages that have been stacked in a random pattern, different shaped packages that have been stacked in a uniform pattern, and different shaped packages that have been stacked in a random pattern.

Claim 17 (new) The robotic package unloading system as described in claim 1, wherein said conveying system is a motor powered roller conveyor.